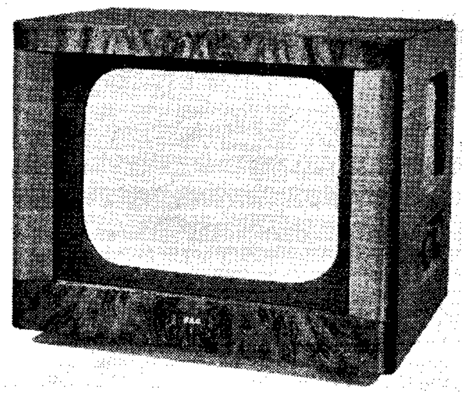
GEC BT5147, BT4544, BT5543

Prices and release dates: *BT5147, £63 (£47 2s. 6d.; plus £15 17s. 6d. tax), July, 1953; BT4544, Console,* £80 17*s.* 0*d.* (£60 9*s.* 6*d.*, *plus* £20 7*s.* 6*d. tax*), *September*, 1953; *BT5543, Console*, £89 5*s.* 0*d.* (£66 15*s.* 3*d.*, *plus* £22 9*s.* 9*d. tax*), *September*, 1953.

Fifteen-valve five-channel television receivers employing a 14in. rectangular grey-screen CRT fitted with blue-tinted daylight filter. Suitable for 200–250V DC and AC 50 c/s. Manufactured by the General Electric Co., Ltd., Magnet House, Kingsway, London, WC2.



ALL three receivers employ the same chassis and differ only in style of cabinet and size of speaker. Model BT5147 is housed in walnut veneered table cabinet and employs a 6½in. PM speaker. Models BT4544 and BT5543 are console versions fitted with 8-in. PM speakers.

The receivers employ a superheterodyne circuit operating on lower sideband of vision carrier. RF, frequency-changer and first IF stages are common to both vision and sound channels. Aerial input, RF and oscillator circuits are separately tunable over a range covering the five BBC television channels, the oscillator tuning control being provided with a calibrated tab giving approximate settings.

Vision interference and sound noise suppression circuits are incorporated. EHT is obtained from line flyback pulses. Mains consumption is 180W maximum on AC and 140W on DC.

Aerial input is for use with 60-ohm coaxial. The outer screen of cable is isolated from chassis by C1 and connected direct to earth wire of mains input lead.

Contrast of picture is controlled by R10, which varies cathode voltage and hence gain of RF amplifier V1 and combined vision and sound IF amplifier V3.

Brightness is controlled by R51 which varies grid voltage of CRT V7.

Vision interference limiter control R49 adjusts anode voltage of interference limiting diode V6A. Normally the control is set so that the diode just remains cut-off at full peak-white signal. The potential dividing network R48, R49 is returned to chassis through slider of Brightness control R51, thus any adjustment to the latter automatically readjusts anode voltage of V6A to compensate for change in brightness level of picture.

Volume control R25 is in grid circuit of sound output amplifier V17. R45, C33 connected in series across R25 provide tone correction. Mains On-Off switches S1, S2 are ganged to volume control spindle.

Vertical hold control R63 adjusts grid time-constant of second triode of frame scan multivibrator formed by V16A, V16B. Scan waveform is developed on C67 which charges up from boosted HT line through R62, R53, and is discharged by conduction of V16B.

Height of picture is adjusted by R53 which varies resistance of charging network and hence amplitude of scan waveform built up on C67.

Vertical form controls. A two-branch negative feedback network, comprising C74, R79, R80, R73, R46, C70, is employed between anode and grid of frame amplifier V17 to correct distortion in output stage.

The preset control R46 is factory adjusted to correct linearity at top of frame scan, whilst R79, which is an accessible control at rear of receiver, affects the general frame linearity.

Horizontal hold. Line scan waveform, developed on C47, s generated by a pentode grid-blocking oscillator V12, the frequency of which is adjusted by variation of grid time constant by R35.

Width of line scan is controlled by a differential width-control comprising a variable shunt coil L22 connected across section L35 of output secondary of line output transformer LT2, together with a variable coil L21 connected in series with deflector coils. As core of unit is adjusted to increase inductance, and hence the impedance of L21, it effects a compensating reduction in impedance of L22, thus maintaining a constant loading on LT2. This ensures that EHT, picture brightness and focus, are unaffected by adjustments to width of picture.

Horizontal form, or linearity of line scan, is controlled by adjustment of inductance of coil L23 which is connected in series with cathode of efficiency diode V14.

Heaters of all valves except V15 are wired in a series circuit and obtain their current from the input mains through thermal surge limiter R68 shunted by R76, and barretter type 305. On 200–230V input the barretter is shunted by R71.

HT is provided by a half-wave metal rectifier MR1 fed from main input through tapped dropper formed by R77 R78. Choke-capacity smoothing is by L24 C71 C72. HT line of RF chassis is RF decoupled by C32 C53. HT feed to V9 V10 of sound section is further resistance - capacity smoothed and voltage dropped by R22 C35. Reservoir smoothing capacitor C72 should be rated to handle 500 mA ripple current.

ADJUSTMENTS

DC mains working. Where difficulty is experienced in obtaining adequate line width on lower voltage DC mains, it is permissible to short out the HT rectifier MR1. Steps must then be taken to ensure that DC mains are always connected to receiver with correct polarity.

Vertical hold control. A synchronised picture is obtainable over an appreciable range of travel on this control. The optimum setting, however, lies within quite narrow limits. It is arrived at by turning down Contrast until picture can only just be held at any setting.

The adjustment which " holds " the picture at lowest possible Contrast setting is correct one. This secures maximum margin of safety against frame slip (roll-over) under varying mains and signal input conditions, and produces optimum interlace. The same technique may be used in adjusting Horizontal Hold control although in this case, the hold setting is more sharply defined at all input levels.

Horizontal form control. In the absence of a suitable test pattern, this control may be adjusted to secure good linearity by adjusting it for maximum picture brightness.

Vertical form control. Adjustment of frame linearity (vertical form) will normally be carried out by adjustment of R79, Vertical Form control, situated at side of receiver. It should only be necessary to use R46, the internal pre-set control when replacing frame output valve V17. As stated earlier, this affects the extreme top of the picture only.

Ion trap. This receiver is fitted with a Mullard MW36–24 tube, which operates in conjunction with an ion trap. This is normally fitted with arrow pointing towards screen of tube, and over line marked on tube neck. After being disturbed for any reason or when fitting a new tube, the ion trap should be adjusted for maximum brightness by rotating it slightly one way and the other, whilst moving it along tube neck from a position immediately adjacent to tube cap. Allow at least three minutes from switching on before commencing adjustment to allow line time base to operate, and cathode of the EHT rectifier to attain emission.

The adjustments should be carried out at various Brightness control settings, starting from minimum, until a picture or raster is observable, after which, complete the ion trap adjustments for maximum brightness, turning down the Brightness control, if necessary, to avoid excessive brightness as the ion trap approaches optimum adjustment.

One object of this routine is to avoid a situation where the Brightness control may be set to produce a very heavy tube beam current without a picture or raster being seen, due to ion trap being out of adjustment. The effect on line timebase may then be such that the heater current to the EHT rectifier is reduced so that emission ceases, and a picture is completely missed, leading the operator to conclude that a fault has developed.

Correction of timebase ringing. The preset capacitor T3 is adjusted at factory to a setting which minimises ringing of line timebase. It is likely to need re-adjustment only after replacement of deflector coils, or of components or valves in line timebase. The need for adjustment will be indicated by the usual light and dark vertical bands (striations) at lefthand side of picture. Adjust T3 to eliminate or reduce these to a minimum, using a synchronised plain raster, or a picture with a light background.

DISMANTLING RECEIVER

To remove cabinet. Remove two control knobs at righthand side and remove back. Withdraw the two large-head screws which will be seen under baseboard located one at each side of receiver, just outside supporting plinth and towards back. These pass through baseboard into cabinet and their removal permits cabinet to be slid forward along baseboard, but not lifted until cabinet has been slid forward as far as a positive stop permits (about ½in.). Then front of cabinet becomes disengaged so that it can be lifted upwards away from receiver.

Cabinet cannot be completely taken away without unsoldering speaker connections, but a sufficient length of lead is provided to render this unnecessary in most cases since most servicing operations can be carried out with cabinet turned back to front, and placed at righthand side of receiver (viewed from the front).

To remove cathode-ray tube. Remove cabinet from receiver as described. Detach EHT connector and valveholder which forms base connector to tube. Remove ion trap. Following withdrawal of two screws securing it to baseboard, remove metal strap passing around the tube. If possible preserve the plastic material interposed between strap and tube, for subsequent re-fitting.

With one hand supporting and holding tube by bulb flare so that tube face is held against operator, the other hand should grasp deflector coils and hold them against bracket supporting tube neck while tube is gently withdrawn. Care should be taken to avoid tilting tube until neck is completely clear of focus assembly, and at no time during handling should tube be held by neck only. When not in its mask, tube should be placed face downwards on a soft smooth surface to avoid scratching.

Replacement of tube. Fitting a tube follows, in reverse, the procedure detailed above but attention should be given to following points :—

Viewed from side, the front edge of mask should appear vertical. If not, it can be assumed that the mask needs re-fitting to tube. Tube should be so positioned that, firstly, bottom edge of mask appears parallel to receiver baseboard and secondly front edge of mask measures ¾ in. from front edge of baseboard. To secure this last result, it may be necessary to slide focus unit backward slightly. To do so, slacken off the two screws securing focus unit mounting brackets to main deck.

Having correctly positioned tube, fit and tighten up clamping strap, not forgetting to replace " Prestik " plastic strips interleaved between clamping strap and top corners of tube. These strips assist greatly in maintaining set position of tube. In cases where it has not been possible to remove them intact for re-fitting, and replacements are not available, it will be found that several layers of ordinary insulation tape make a satisfactory substitute. A 16in. length of tape arranged in seven 2in. foldovers so that the sticky face finishes up outermost at each end, will be found suitable.

Whether or not it has previously been necessary to adjust position of focus unit, the screws should now be slackened off, and the focus unit pushed forward so that the deflector coils become a good friction fit between coned bulb of tube and face of rubber grommet supporting tube neck in focus unit mounting bracket.

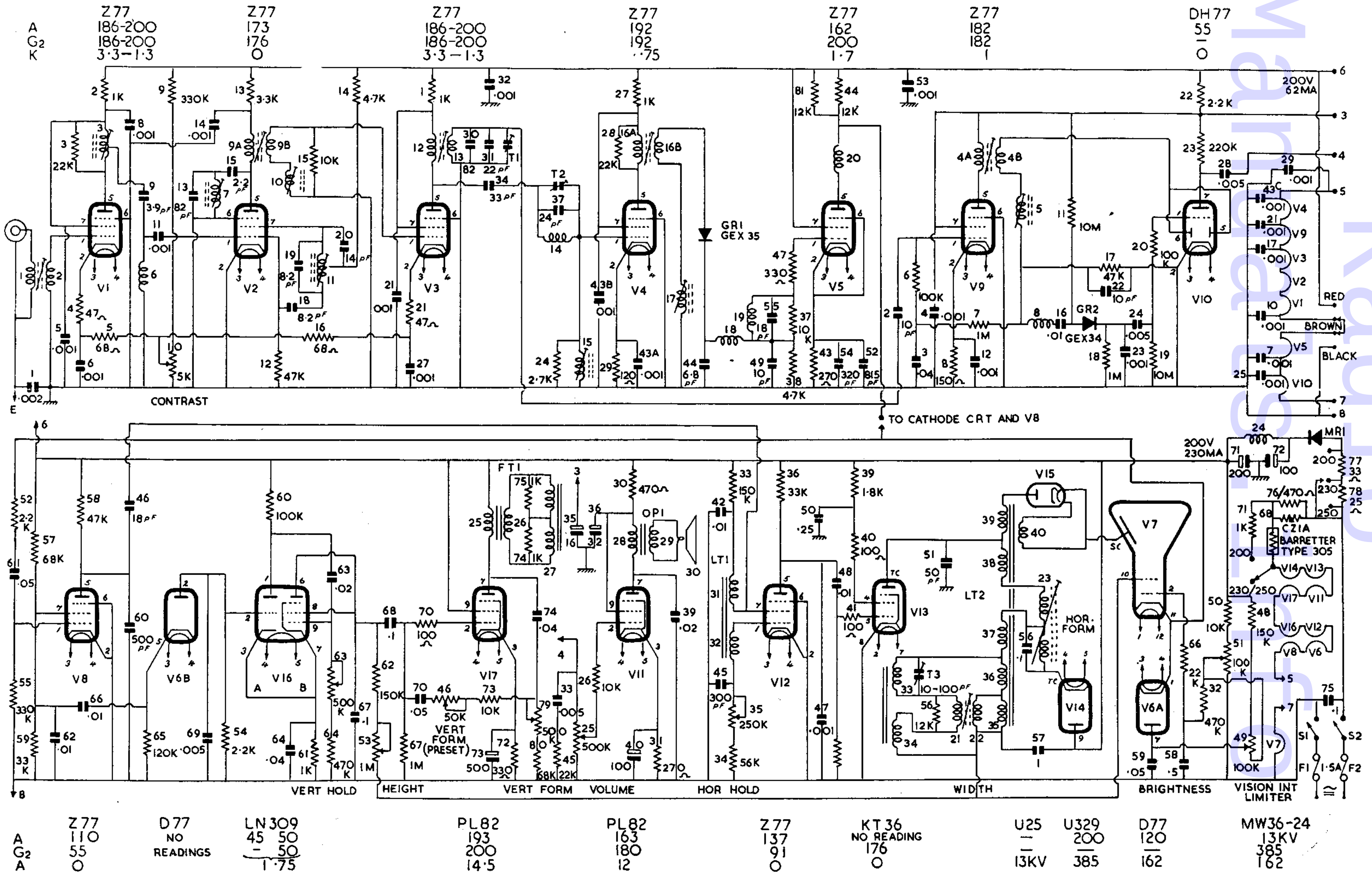
In re-tightening clamping screws, make sure that focus unit bracket is maintaining this slight forward pressure, and that bracket is square in both horizontal and vertical planes with respect to

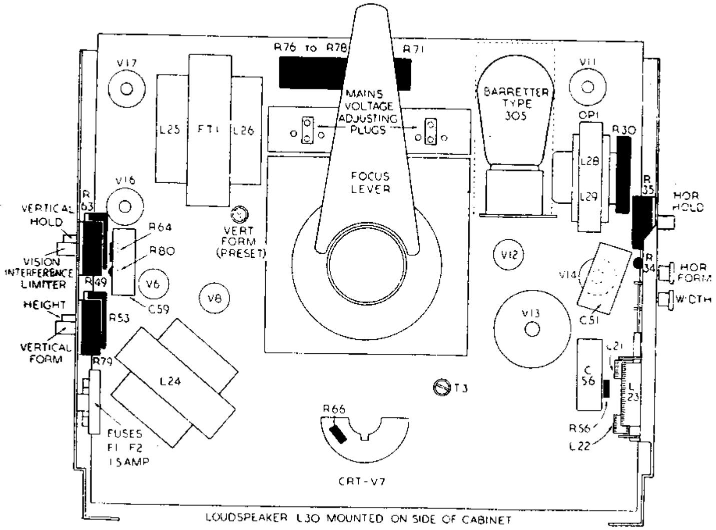
● **THIS CHART INTRODUCES** features making it more informative and even quicker to use. Valve voltages adjoin the circuit. The circuit includes component values—always placed lower than code numbers. Description of familiar circuitry is replaced by additional practical information.

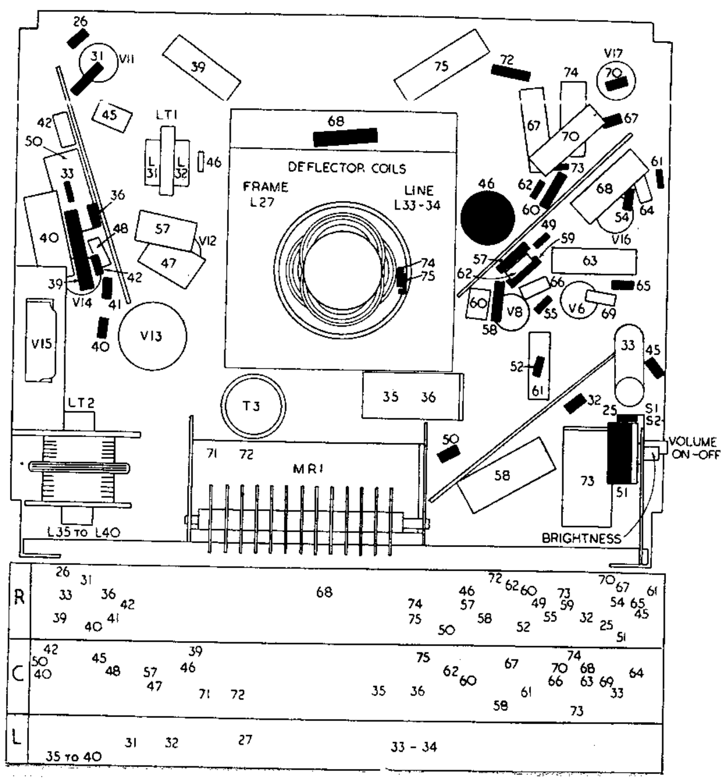
RATINGS OF COMPONENTS

Resistors. All except those given below are ¼W type.
R10, 71—2W.
R13, 22, 25, 31, 34, 44, 50, 51, 57 to 60, 72, 81—½W.
R30, 35, 39, 46, 49, 53, 63, 79—1W.
R77—8½W. R78—6½W.

Capacitors
Tubular 150V—C3 C64.
Tubular 250V—C57.
Tubular 350V—C23, 42, 48, 50, 56, 58, 62, 66, 67, 68, 69.
Tubular 500V—C16, 59, 61, 70, 74.
Tubular 750V—C63, 39.
Tubular 1kV—C24, 28, 33.
Tubular 300V AC—C75.
Silver Mica 350V—C13, 30, 37, 47, 52, 54, 60.
Silver Mica 750V—C1.
Silver Mica 5kV—C51.
Moulded Mica 350V—C45.
Tubular Ceramic 500V—C2, 9, 15, 18 to C20, 22, 31, 34, 44, 46, 49, 55, 43 ABC.
Ceramic Disc 500V—C4 to 8, C10 to 12, C14, 17, 21, 25 to 27, C29, 32, 53.
Electrolytic 12V—C40.
Electrolytic 25V—C73.
Electrolytic 275V—C35, 36, 71, 72.







INDUCTORS

L	Ohms
1-7	... Very low
8	... 2.5
9-17	... Very low
18	... 2.5
19	... Very low
20	... 2.5
21	... 2.3
22	... 1
23	... 7.9 (3.3 +4.6)
24	... 85
25	... 216
26	... 7.5
27	... 24.7
28	... 448
29	... Very low
30	... 2.75
31	... 5.5
32	... 8.5
33-34	... 14.4
35	... Very low
36	... 4.3
37	... 5.8
38	... 3.6
39	... 24K
40	Very low

receiver chassis. It is possible to tilt this bracket in the vertical plane and, to a lesser extent, in the horizontal plane, so that aperture of focus unit becomes eccentric with respect to neck of tube. This condition should be avoided and, when viewed from rear, tube neck should appear as nearly as possible concentric with bore of focus unit.

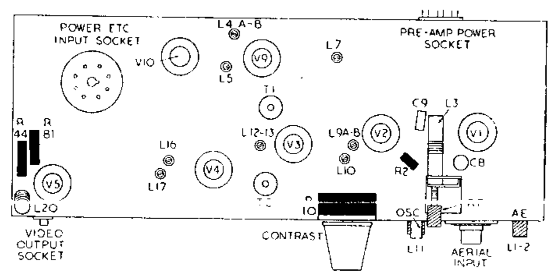
The objects of maintaining a slight forward pressure on deflector coils are: (1) to ensure that they fit well forward on tube to avoid possibility of corner cutting; (2) to prevent subsequent accidental rotation of coils during use; (3) to ensure that the deflector coils are reasonably concentric with tube neck by utilising centring action of flare of tube, which results when coil is fitted right up to it.

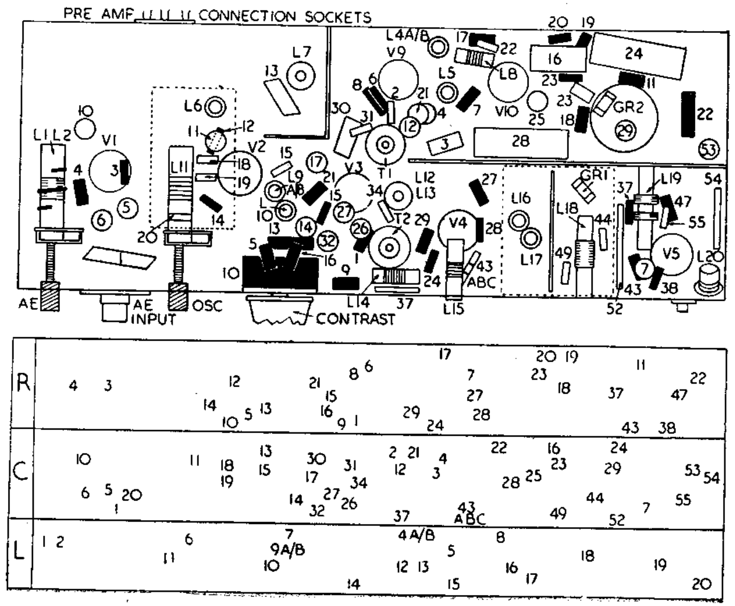
Where production tolerances result in a slack fit between tube neck and deflector coil, it may not be possible by this means to prevent the deflector coils being tilted or displaced with respect to tube neck, to a degree which results in some raster distortion. Due to the weight of the coil such displacement will generally be in a downward direction, resulting in the lower corners of the picture being drawn outwards and downwards, to produce an effect similar to " Pin-cushion " distortion in lower half of picture only. In such cases, it is advisable to provide some packing between tube neck and coil and, in fact, the receiver may have been dispatched from the works with such packing fitted. It should, of course, be retained in fitting a new tube. When fitting deflector coil over tube neck, note that flare portion of coil fits towards the face of tube and that pinch bolt securing clamp around coil is at top.

To remove RF chassis. Detach the video and earth leads. Undo the two screws securing sub-deck mounting flanges to main chassis. In subsequently replacing these, it is important to screw them right home so that they are in good electrical contact with tags of bonding leads through which they are fitted. After sliding sub-deck part way out the interconnecting cables should be removed. The deck may then be completely removed, care being taken whilst handling it to avoid accidental movement of concentric trimmers T1, T2.

Adjustment to required channel. Set Contrast and volume controls to maximum, turning them down as required to maintain reasonable levels during subsequent tuning adjustments. With end face of oscillator knob somewhere near appropriate calibration setting, adjust inwards or outwards, as required for maximum sound. Adjust aerial and RF tuning knobs, respectively, for maximum picture brightness. Then adjust oscillator control for minimum sound-on-vision. A sensitive indication of this may be obtained as described in section on correction of faulty response, under sound-on-vision.

Finally, adjust aerial and intervalve coils for optimum picture quality. Ideally, these should be tuned to mid-band frequency, which is attained at a setting about one-half to one turn outwards from that which gives maximum brightness. A slight deviation from this is permissible, if necessary, to correct for " plastic " (excessive white after black or overshoot) at one extreme, or "fuzziness" (apparent lack of definition) at the other.





ALIGNMENT INSTRUCTIONS

IF amplifier. Alignment will normally be necessary only when trimmers or core slugs in IF amplifier have been accidentally disturbed, or when coils or trimmers in this part of the circuit have been replaced.

Equipment required. An accurately calibrated signal generator. If sensitivity measurements are to be attempted the generator should have an output impedance of 60ohms or be used with an equivalent matching pad. A high resistance DC voltmeter, 0-250V or 0-100V. A high resistance (rectifier type) AC voltmeter, 0-50V or 0-100V. Non-metallic tools for the adjustment of coil slugs and concentric type trimmers. One 330 ohm non-inductive resistor.

Preparation for alignment. Disconnect earth and video leads from sub-deck, and withdraw it as described under " Dismantling the receiver " but without disconnecting the eight-way cable. The sub-deck should then be so positioned that, with one end left close to the main deck to permit video lead to be reconnected (essential to prevent damage to tube), all core slugs and two concentric trimmers are accessible.

Connect DC voltmeter between anode of video valve and chassis. Connect AC voltmeter across primary winding of sound output transformer. Connect signal generator across L6 with " live " side of the signal generator output connected to the high potential end of the coil. Adjust Brightness to minimum, Volume to maximum, and Contrast to a position about one-quarter rotation from maximum gain. Run receiver for at least five minutes before commencing alignment.

Under no signal conditions the DC voltmeter will read approx. 200V. The signal output during alignment operations should be so adjusted that change in voltage

Continued on page 31

capacitively coupled to MW frame L1 through C37.

In LW position of S1A the frame aerials and loading coils are all connected in series and tuned by VC1, the external aerial signal in this instance being coupled to bottom end of LW loading coil L7. LW circuit is trimmed by adjustment of core of L7.

L15 C11 constitute a tuned IF filter.

Oscillator employs g1 and g2 of heptode V2 as a triode connected in a tuned grid shunt fed anode circuit. The grid coils L3 (MW) L8 (LW), trimmed by C18-C39 and padded by C16 C17 respectively, are switched by S1B to oscillator tuning capacitor VC2 and coupled by C13 to g1 of V2. Automatic bias for grid is developed on C13 with R18 as leak resistor. Anode reaction voltages are developed inductively from L4 (MW) L9 (LW) and switched by S1B through C14 to oscillator anode (g2) of V2, of which R21 is load.

IF amplifier operates at 470kc/s.

Output stage. Signal at anode V4 is fed by C32 to g1 of pentode output amplifier V5. Valve is biased by approximately 6V, this being the potential difference between centre tap of its filament, which is at high potential side of LT supply, and earthy end of its grid resistor R30, which is connected to a potential dividing network R9 R10 across series filaments of V1 to V4. Screen voltage is obtained direct from HT line, decoupling being provided by C2. Audio output is transformer coupled by OP1 to a 5-in. PM speaker L18.

HT of 90V is provided by two 45V Ever Ready B104 or equivalent type batteries connected in series, or alternatively from the mains. Receiver HT line is switched by S2 to either source of supply.

HT battery is decoupled by C2, which on mains-generated HT functions as a smoothing capacitor. S5, which is operated by volume control spindle, is HT battery on-off switch.

When receiver is operated from mains supply the HT is provided by series connected metal rectifiers MR1 MR 2 fed direct from input mains. HT is resistance-capacity smoothed by R1 C1 C2 with R5 R6 R7 R34 switched in or out of circuit by S9 to give voltage adjustment.

Reservoir smoothing capacitor C1 should be rated to handle 175mA ripple current.

Battery vitalizing. When receiver is fitted with batteries it is possible to prolong life of HT battery by "charging" it from the mains. To do this the receiver should be connected to the mains supply and switched on. The Mains-Battery Charge switch should then be placed in its Battery Charge position. This opens S7 and closes S8, thereby disconnecting rectified HT feed from main voltage dropper and smoothing resistor R1, and reconnecting it through R32 R33 S2 and S5, to HT battery. The charging current is approximately 7mA.

LT of 9V for the series connected filaments of V1 to V5 is provided by two 4.5V Ever Ready Alldry 28, or equivalent type, batteries connected in series, or if the receiver is operated from the mains, from the rectified and smoothed HT through droppers R2 R3. Additional smoothing to LT line is given by C3 C31, whilst C36 is RF bypass capacitor. R3 is factory adjusted to give a filament current of 46.4mA with receiver set for 245V and operated from 241V 50c/s input. R11 R12 R13 R14 are current bypass resistors to maintain correct voltage across each filament. R15, which is connected in series with filament line between V3 and V5, is short circuited when S2 is placed in its Battery position. S6, which is ganged to S5 and operated by volume control spindle, is LT battery on-off switch.

S3 and S4 which are ganged together and also operated by volume control spindle, form mains on-off switch. C4 is mains filter capacitor. Mains input incorporates safety contacts and a 160mA fuse in each lead. The safety contacts are open circuited and hence mains supply to receiver broken when rear panel of cabinet is removed.

Removal of chassis. Remove rear panel of cabinet by fully slackening off the four captive fixing screws. Disconnect leads from tag block on rear panel by unplugging them from the sockets. Remove the two knobs (held by grub screws) and then the two lower push-on concentrically mounted switch controls. Release battery leads from their clamp. Place receiver on its front and undo and remove the two chassis fixing bolts. The chassis is removable by lifting rear edge of chassis towards you, to clear the locating pegs, and then downwards towards base of cabinet.

Removal of top moulding. Remove chassis as described above. Remove the two outer rear fixing bolts and centre rear spire nut. Slacken the two outer front bolts and turn brackets out of slots in cabinet. Moulding is now free to be removed.

Renewal of cursor drive cord. Turn gang condenser to maximum capacity. Place tensioning spring over anchoring lug on drum and attach one end of cord to end of spring. Lead cord over stud, and around pulleys A B and C. Wind three turns clockwise around tuning spindle, and then pass cord anti-clockwise round pulley D, clockwise round the drum and hook end of cord on to spring. The latter operation is made easier if the cord is temporarily removed from pulley B—the spring can then be stretched sufficiently to allow cord to be replaced around that pulley. Pointer is secured to cord by a set screw. With gang at maximum capacity the pointer should line up with letter "m" at right-hand end of LW scale.

TRIMMING INSTRUCTIONS

Apply Signal as stated below	Tune Receiver to	Trim in Order stated for Max. Output
(1) Place gang at minimum capacity, volume control to maximum and switch to MW band.		
(2) 470 kc/s to g3 of V2 via .047 capacitor	—	Cores L13, L12, L11 and L10
(3) 470 kc/s to g1 of V1 via .047 capacitor	—	Core L5 for *minimum*
(4) 540 kc/s as above	Gang at maximum	Core L3
(5) 1.585 mc/s as above	Gang at minimum	C18 and repeat (4) and (5)
(6) 140 kc/s as above	Gang at minimum	Core L8
(7) Remove chassis from case and reassemble frame, and chassis on bench. Batteries should be placed approximately in their normal positions with respect to chassis, whilst frame aerial needs to be kept about 3½in. from rear of chassis. Couple signal generator to frame via a loop in close proximity.		
(8) 600 kc/s to frame via loop	Tune for maximum output	Core L6 (Bot)
(9) 1.5 mc/s as above	Ditto	C7, repeat (8) and (9)
(10) 150 kc/s as above	Ditto	Core L7 (Top)

GEC BT5147—*Continued from p. 29*

does not exceed 20 volts. Similarly, the sound output, as indicated by the AC voltmeter, should not exceed approximately 30 volts. In the instructions which follow, "maximum vision response" implies maximum video output as indicated by maximum change downwards in DC voltmeter readings while "maximum sound" indicates maximum deflection of AC voltmeter indicating sound output.

Procedure. Adjust the signal generator to 35.625mc/s. (unmodulated). Connect 330-ohm resistor across L16 (using short leads) and adjust core L17 for maximum vision response. Remove shunt resistor and similarly adjust L16. Transfer shunt to L9 and adjust L10. Remove shunt resistor and similarly adjust L9.

With signal generator set to 32.625mc/s. (unmodulated) adjust L7 for *minimum* vision output. Adjust signal generator to 35.625mc/s. and re-check L9. Roughly tune L15 for maximum vision response.

Set signal generator to deliver a modulated input at 37.625mc/s. Roughly tune T1 and T2 for *minimum* vision response. Short circuit trimmer T1 and adjust L12 for maximum vision response. Remove short circuit from T1 and give final adjustment to T1 and T2 for *minimum* vision response. Adjust L5 and L4 respectively for maximum sound output.

Re-set signal generator to 35.625mc/s. (unmodulated) and give final adjustment to L15 for maximum vision response.

This completes the IF alignment operations except for the sealing of the variouscoil slugs adjusted, which may be achieved by applying a small dab of Bostik or similar adhesive between the dust cores and the coil formers.

CORRECTION OF FAULTY RESPONSE

Sound on vision. Assuming that adjustment of oscillator (L11) does not clear this, the sound take off and rejection circuits should be adjusted. This may be carried out with the use of a signal generator by careful adjustment of T1 and T2 on a transmission. A sensitive indication may be obtained by adjusting the Horizontal Hold control to slip the picture so that the edge can be seen; the presence of even a small amount of sound on vision causes this to appear ragged or wavy. Following adjustment of T1 and T2 for optimum results, it may be worth re-checking the oscillator setting for further improvement. Where the circuits concerned are well out of adjustment, re-alignment on a signal generator will have to be carried out, as detailed in the previous section.

Vision on sound. Where present, this will be due to cross modulation. It may be remedied by interchanging V1 or V3 with any other Z77 in the receiver, except V2. In cases where the receiver is connected straight to aerial and is running nearly at maximum gain, this is the only remedy, but in other cases, where there is plenty of gain in hand, the fitting of an aerial attenuator, or the use of a different value if an aerial attenuator is already in use, may clear the trouble by allowing the receiver to operate at a different gain control ("Contrast") setting for same picture contrast.

"Plastic" (excessive white after black) or "Overshoot." A frequent cause of this is misalignment of the aerial circuit. The remedy is to adjust L1/L2 while observing a test pattern such as Test card C. Adjust to compromise between "plastic" at one extreme and "fuzziness" at the other as judged by the 2.5 and 3.0 mc/s. bars. In other cases similar adjustment of L15 and L16 may be effective.

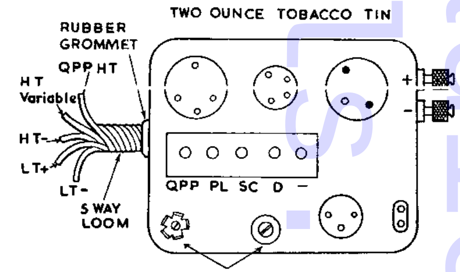
SERVICE CASEBOOK

MODIFICATION TO ELIMINATOR

A WELL-KNOWN service eliminator providing variable HT and LT seemed to have only limited use since its bulk on the bench tended to restrict accessibility to the set on test. The shortness of the usual battery leads prevented the instrument being placed elsewhere.

To overcome this the various sockets and terminals were removed from the main panel and it was found that by careful grouping, all could be fitted into a two-ounce tobacco tin. Even the dropping resistors and their decoupling condensers were accommodated, the whole being covered with a sheet of thin insulation before the lid was fitted and fixed with two small blobs of solder. Connected to the main instrument with a five-way loom this modified eliminator was found to be most useful, presenting as it does a rapid form of basic testing.

As the off-load and on-load readings on the voltmeters are by no means identical, open circuits are at once shown up. And with the LT adjusted well below normal the removal of each valve "in turn" (just sufficiently to break the filament circuit) is indicated by a rise in the readings of both HT and LT meters due to removal of load. If no rise, then there's no circuit. Only the demodulator takes so little current that its effect on HT passes unobserved.—E. H. Meadows, Alton.



REGENTONE A353

THIS set was completely dead. Checking the voltages I was amazed to read 20V on the DDT cathode. Grid checked OK, but a high-voltage registered on another pin, which proved to be the AVC diode.

The AVC feed condenser had obviously developed a bad leak, and a replacement put everything in order.

METAL RECTIFIERS

METAL rectifiers, considered prewar to be almost infallible, now seem to need changing as frequently as valve rectifiers.

Intermittent working in the Ekco Stroller, MBP99, is usually due to low rectifier output reducing LT voltage to the FC valve.

I recently replaced both HT and LT rectifiers in an all-dry mains unit only 18 months old because of low output.

The Ultra Twin is another example. Sets have been tested with 5V or less LT.—E. C.

PHILIPS 371U; MULLARD MUS221

HERE is quite a common fault in these sets. No continuity can be measured from pin to pin on the mains plug. Mains dropping resistor is OK. Dial bulb also. Valve heaters intact, switch OK and mains lead OK.

Have a look at R33 and R34 (33ohms and 82ohms, respectively) as they form a bias network between one side of the mains and chassis. I have had several cases of burn-outs here and find it profitable to replace with a higher-wattage component.—K.U.